A RESEARCH PROPOSAL OF Ph.D. (MANAGEMENT) THESIS ENTITLED

"A STUDY OF DROUGHT AND ITS IMPACT ON SOCIO-ECONOMIC CONDITIONS OF FARMERS IN MARATHWADA REGION"

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By

Sakeb Abdul Hakim Osmani

Under the Guidance of

Dr. Pramod H. Patil

(Assistant Professor, S.R.T.M. University, Sub center, Latur)

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Introduction

Drought is one of the most creeping disasters in India. Around 68 percent of geographical area of country is prone to drought conditions. India, whose economy is based on agriculture is regularly facing such natural disasters. Every year around 2.5 percent of country's GDP is lost due to natural disasters. Some major droughts in the history of India are 1972, 1979,1982,1985,1987, 2002, 2009 2014, 2015 had long term impact on socio-economic conditions of peoples.

Higher temperatures and declining rainfall patterns, as well as increasing frequency of extreme climate events (such as droughts and floods), are the expected future climate in the tropics (IPCC, 2007; Mitchell & Tanner, 2006; IPCC, 2001). These predicted changes in climate are expected to have differential impacts on agricultural productivity, food security and other sectors, across spatial and temporal scales. Semi-arid regions of the world are often thinking of as being particularly vulnerable to climate change. They are already climatically tense with high temperatures, low rainfall and long dry seasons. Semi-arid ecosystems are highly energetic, with bursts of productivity in the wet season and in good years, and very low productivity in dry years, often leading to temporary or longer-term land deprivation.

Marathwada region is extremely prone to drought situation and this region is experiencing it regularly after every three years. Drought impacts are long lasting, at times enduring for many years; and human or social factors often aggravate the effects of drought. It is necessary that, people to change their traditional life styles in their sectors and adopt different tools and techniques in agriculture and industrial sectors to mainstream the effect of climate change and drought management.

Recurring droughts over Marathwada had a threatening impact over water reservoirs as well as groundwater storage. Major dams in Marathwada region like Jaikwadi in Paithan, Manjara in Dhanegaon Tq. Kaij do not reach to their full capacity as there is no enough rainfall, because of this it is priority to release water for drinking purpose and not for irrigation. As a result of this, farmer started digging bore wells to support agricultural activities which in turn resulted in depletion of ground water level. Now a day, in Marathwada, no ground water is available above 400-500 feet. 66 talukas in Marathwada show severe depletion in groundwater level.

The periods of drought are experienced immediate Ground water fluctuations. In order to be prepared for droughts, it highly important to get an alert about upcoming drought well in advance. Examining Drought indicators is the most important thing in this regard. This study, an attempt is made for preparedness drought situations by tracing the trends in rainfall, exploring drought management practices and evaluating the impact of drought on Socio-Economic Conditions of farmers in Marathwada region.

Statement of the problem

The intensity of water crisis in 55 villages in Aurangabad, 152 villages in Latur, 14 villages in Jalna and 28 villages in Osmanabad where no more water to be pumped out. The most severe impact of drought is effect on social life. Drought in Marathwada has ruined rural life mainly. Due to inability to bear crop losses and financial predicament; 422 farmers committed suicide in 2014.

The situation became worst in 2015 as famer suicide poll reached highest in previous 10 years. In 2015, eight districts of Marathwada collectively recorded 1109 suicides. Beed district alone recorded 299 cases of them.

Amongst various drought years, the 2016 drought was worsening. In 2016 almost all reservoirs were dry. It resulted in water scarcity for the entire region; the severity was more for Latur Beed and Osmanabad districts. Due to less rainfall and surface water scarcity, the ground water level of the entire region decreased drastically during drought period. The Latur district's ground water level decreased on an average by 3.29 meters. It was highest for Ahmedpur (4.49 meters) and Jalkot taluka (4.42 meters), and lowest for Devani (2.52 meters) and Ausa (2.78 meters). In the month of April/ May almost all surface and underground water sources were dried thus forcing the district administration to take the unusual step of water supply by railway wagon.

Rainfall is considered to be the most important indicator and therefore related meteorological data should be mandatorily considered in making any assessment of drought (Drought Manual, GoI, 2016). So, rainfall analysis as a mandatory indicator of drought is proposed in the present study. In addition, other drought indicators are also studied. One main objective of this study is therefore to measure the aggregate short term and long-term impact of drought on farmers of

Marathwada region. Drought affects water, fodder, crop availability but it also affects people and their web of life. So along with failure of agriculture there are socio-economic reasons which are making people more vulnerable. As household size and composition, level of income, cropping pattern and socio-economic condition of farmers vary across the state and districts such differences are likely to influence the livelihood significantly. Drought is an important factor which decide source of income for millions of farmers. The present investigation was undertaken to study the drought, its impact on farmers of Marathwada region, to critically evaluate drought management measures adopted in Marathwada and to analyze community-based drought management practices in Marathwada region of Maharashtra state.

"A STUDY OF DROUGHT AND ITS IMPACT ON SOCIO-ECONOMIC CONDITIONS OF FARMERS IN MARATHWADA REGION"

Literature Review

1. **B. Edwards, M. Gray and B. Hunter (2018)**[1] - This study addresses the lack of research into the socioeconomic impact of drought using data from the 2007 Rural and Regional Families Survey (RRFS). One of the main contributions of this analysis is to provide consistent estimates of the social effects of drought by employment status. Section 2 provides an overview of the data used in the analysis, some comments on how to best measure drought, and an introduction to both the socioeconomic outcomes analyzed and the method for estimating the impact of drought. Section 3 presents the results and provides detailed analysis. Section 4 provides a conclusion that draws together some of the policy and research implications of the analysis.
2. **Ya Ding, Michael J. Hayes, and Melissa Widhalm (2010)**[2] in their study reviews the literature of drought economic impact studies in both agricultural and non-agricultural sectors, summarizes the methods and data employed, compares the various results, and investigates the problems and limitations of previous studies. The paper concludes with a discussion of the challenges and directions of future improvement on drought economic impact assessment.
3. **Megha Pandharinath Salve (2017)**[3] As the study is based on rainfall series investigation of Marathwada, different rainfall-based drought indices are evaluated namely Rainfall

Departure (RD), Standardized Precipitation Index (SPI), Rainfall Decile based Drought Index (RDDI), Z-Score and China Z-Score (CZI) so as to find out characteristics of the drought events. The features evaluated by these all-drought indices are also related in this study.

4. **Rajpoot Pushpendra Singh, Kumar Ajay (2014)**[4] In this study, analysis of 60 years rainfall data of Solapur district was carried out. The study is restricted to deviation from long term average rainfall (±19 %, no draught, moderate drought between deficiency -20 to -59 % and deficiency more than -60 % severe droughts). Severe drought experienced only in three years, moderate drought in about ten years and for most of the years no drought condition has been reported. To get the strength of drought, parameters are used which are suggested by IMD, 1971. Minimum intensity of precipitation is found in 1968 and maximum intensity of precipitation in 1956. In spite of having normal rainfall for maximum years, Solapur faces water shortage problems for almost the entire year. It is necessary to prepare an administration plan for the expansion of water resources to reduce water scarcity.
5. **Dr. Sampat Kale, Dr. Jitendra Kumar Gond (2016)**[5] In this article the issues and challenges of the dry Marathwada region and why there is a disappointment of polity, economy, and social and efforts of civil society in making drought free regions of Maharashtra were discussed. The article also attempts to understand the root causes behind the deteriorating drought situations in Marathwada region of Maharashtra and what could be the long-term policy level actions need to be taken by the policy makers.
6. **Govind Katalakute, Vasant Wagh, Dipak Panaskar, Shrikant Mukate, (2016)**[6], Study has been carried out considering objectives to assess the rainfall pattern, its spatial distribution and water availability in dams during 2011 –2015. The relationship of rainfall pattern, agricultural production, and farmer suicides in Maharashtra state during 2011-15 has been studied.

Objectives of the proposed Study

1. To study droughts in Marathwada region
2. To understand and measure the aggregate short term and long-term impacts of drought on farmers in Marathwada region
3. To explore consequences of drought on socio-economic conditions of farmers
4. To critically evaluate drought management measures adopted in Marathwada region
5. To analyze community-based drought management practices in Marathwada region

Hypothesis Of the proposed study

$H0_1$- Rainfall mandatory indicator has no impact on drought
$H1_1$- Rainfall mandatory indicator has significant impact on drought

$H0_2$- There is no Short-term and Long-term impact of drought on society at large
$H1_2$- There is significant Short-term and Long-term impact of drought on society at large

$H0_3$- Drought has no impact on social conditions of farmers
$H1_3$- There is significant impact of drought on social conditions of farmers

$H0_4$- Drought does not affect economic conditions of farmers
$H1_4$ - There is significant impact of drought on economic conditions of farmers

$H0_5$- Community-based drought management practices are not efficient to mitigate the impact of drought
$H1_5$ – Community-based drought management practices are significantly efficient to mitigate the impact of drought

Research Methodology

Proposed Research design

This study involves both qualitative as well as quantitative data. Out of the different categories (i.e., exploratory research, descriptive research). Exploratory and Descriptive Research design will be used for different phases of research.

Temporal & Geographical Scope of Study

This Study will be conducted in Marathwada region of Maharashtra state. Farmers from villages of districts will be surveyed. This study will be carried out considering drought years during 2005-2022. However, mandatory indicator of drought i.e., historical rainfall data of entire region will be studied since from 1980.

Limitations of the study

The study of drought management practices will be restricted to drought years from year 2005.

Sampling Method

Sampling methods are classified into Probability sampling and non-probability sampling. In Probability sampling, probability of selection of sample is same. In this study multistage sampling method will be used.

For sampling procedure stratified sampling, simple random sampling and systematic sampling will be used to select respondents at various stages of study.

Sampling Unit:

The farmers from villages of different eight districts in Marathwada region will be considered as the sampling unit of this study.

Sample Size Estimation

If we assume confidence level and confidence interval then it is possible to estimate sample size. Let us assume probability of happening and not happening be 0.5 Confidence level as 95% and margin of error as 5% then.

Proposed Sample size

Table No. 1: Farmers population of Marathwada region (Sample size estimation as per farmers population)

Sr. No.	Block	Marginal (below 1.00 ha.)	Small (1.00 to 2.00 ha.)	Semi-Medium (2.00 to 4.00 ha.)	Medium (4.00 to 10.00 ha.)	Large (above 10.00 ha.)	Total Farmers Population (3+7)
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Aurangabad	293716	185373	83352	21578	1746	585765
2	Beed	433643	196151	99824	27295	1555	758468
3	Jalna	230643	148011	77561	19900	1137	477252
4	Latur	190447	148729	72955	21566	1042	434739
5	Nanded	299161	221898	104753	19641	1296	646749
6	Osmanabad	158261	141393	79881	28493	1967	409995
7	Parbhani	174615	130006	70617	17889	1336	394463
8	Hingoli	107862	80090	45925	11382	710	245969
Total (Marathwada region)		**1888348**	**1251651**	**634868**	**167744**	**10789**	**3953400**

Source: Agriculture Census 2015-2016 Final part1 (pages 10-36) http://krishi.maharashtra.gov.in/1299/10th-Agri-Census-2015-16-Report

Sample size according to morgans formula (Marathwada region) – 384 nos

Sr.no	District	District wise sample size in nos according to morgans formula
1	Aurangabad	79
2	Beed	55
3	Jalna	42
4	Latur	53
5	Nanded	72
6	Osmanabad	35
7	Parbhani	39
8	Hingoli	25
	Total	**400**

Total population of farmers in Marathwada region is 3953400. As per morgans formula proposed sample size is shown in above table. Expecting possibility of incomplete questionnaire and keeping margin for probable error, so number of persons to be surveyed are 400 (No. of respondents from each district will be surveyed as per proportion of population of the districts)

Data Collection Plan

A. **Primary data:**

Primary data will be collected through questionnaire and interview techniques by taking a field survey of the identified sample population of the respondents in different areas of Marathwada region.

B. **Secondary data:**

Secondary data will be collected from journals, books, magazines, research papers, newspapers, news, government reports, and periodicals websites of government institutions and government websites, portals etc.

Data Collection Instrument

A well-structured questionnaire will be used as research instrument to collect primary data.

Data Analysis Plan

A. Statistical Methods

For analysis and interpretation of data collected will be done by using both descriptive Statistics (Percentage, Mean, mode and median) as well as inferential statistical methods such as Chi square test and one sample t test.

B. Software for Data analysis

In this study software to be used for data analysis is MS- EXCEL 2019, SPSS 20.0.

Chapter Scheme

1. Introduction
2. Review of Literature
3. Research Methodology
4. Drought: Causes and Impacts
5. Drought Management
6. Data Analysis and Interpretation of data
7. Findings of the study
8. Conclusion

Time required

Apr	22 to	May 22	Introduction
Jun	22 to	Aug 22	Literature review and model building
Aug	22 to	Sep 22	Secondary Data Collection
Oct	22 to	Nov 22	Questionnaire Design
Dec	22 to	Jan 23	Primary data collection
Feb	23 to	Mar 23	Data tabulation & Presentation
Jan	23 to	Feb 23	Data analysis
Mar	23 to	Apr 23	Conclusion
May	23 to	Jun 23	Report writing
Jun	23 to	Jul 23	Presentation

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Sakeb Abdul Hakim Osmani
(Research Scholar)

Dr. Pramod H. Patil
Assistant Professor
School of Management Sciences,
S.R.T.M. U. N. Sub-center, Latur
(Research Guide)

Assistant Professor
School of Management Sciences
Sub-Centre SRTMUN
Latur